

Claims:

Amend the claims 1, 3-4, 6-7, 10-18, and 21-23, cancel the claims 2, 5, 8-9, 19-20, and 24-25, and add the new claim 26 as follows:

Claim 1 (currently amended): A multiband MIMO-based dual-mode portable station of 3G W-CDMA and UWB communication receiver system has P Wideband Code Division Multiple Access (W-CDMA) and Ultra Wideband (UWB) portable stations having N antennas, a Multiple-Input Multiple-Output (MIMO)-based UWB base station having M antennas, a MIMO-based W-CDMA base station having Q antennas, an UWB multiband, a W-CDMA frequency band, and MIMO channels, where M, N, P, Q, and R are integers and greater than 1, the communication system further comprising:

a MIMO-based dual-mode 3G W-CDMA and UWB filtering and multicarrier RF section;

a 3G W-CDMA baseband processor;

an UWB OFDM multiband baseband processor;

a 3G W-CDMA and UWB OFDM multiband control processor; and

a multiple antenna unit.

said MIMO-based W-CDMA base station including a W-CDMA baseband processor unit coupled to a MIMO-based W-CDMA filtering and multicarrier radio frequency (RF) unit that is connected to a W-CDMA control processor unit, which is connected with the W-CDMA baseband processor unit;

said MIMO-based W-CDMA filtering and multicarrier RF unit coupled to the Q antennas;

said W-CDMA baseband processor unit further including two digital filters, two down samplings, a MUX, and a multiband rake receiver and decoder unit;

said MIMO-based UWB base station including an UWB baseband processor unit coupled to a MIMO-based UWB spreading and filtering unit followed by a MIMO-based modulation multicarrier unit that is connected to an UWB control processor unit, which is also connected with the UWB baseband processor unit and the MIMO-based spreading and filtering unit;

said MIMO-based modulation multicarrier unit coupled to the M antennas;

each of said P W-CDMA and UWB portable stations including a MIMO-based dual-mode W-CDMA and UWB filtering and multicarrier unit, a W-CDMA mobile baseband processor unit, an UWB OFDM multiband baseband processor unit, a W-CDMA and UWB OFDM multiband control processor unit, and a sharing memory bank unit;

said MIMO-based dual-mode W-CDMA and UWB filtering and multicarrier unit further including two low noise amplifiers followed by two automatic gain controllers coupled to two analog bandpass filters connected to two dual-switch units, one of said two dual-switch units coupled to a W-CDMA down converter and demodulation and another of said two dual-switch units coupled to an UWB multiband down converter and demodulation, and both of said W-CDMA down converter and demodulation and said UWB multiband down converter and demodulation coupled to an analog-to-digital (A/D) converter unit;

said A/D converter unit having two switch units that are controllable, each of the two switch units having two inputs and one output, and 8 A/D converters; and

said MIMO-based dual-mode W-CDMA and UWB filtering and multicarrier unit coupled to the N antennas.

Claim 2 (cancelled)

Claim 3 (currently amended): The multiband MIMO-based dual-mode portable ~~station of 3G W-CDMA and UWB~~ communication ~~receiver system~~ of claim [[2]] 1 wherein each of said two dual-switch units having two internal switches [[are]] is controlled by said W-CDMA and UWB OFDM multiband control processor unit to provide information from the two analog bandpass filters either to the [[3G]] W-CDMA down converter and demodulation or to the UWB multiband down converter and demodulation.

Claim 4 (currently amended): The multiband MIMO-based dual-mode portable ~~station of 3G W-CDMA and UWB~~ communication ~~receiver system~~ of claim 3 wherein said ~~two dual-switch may be controlled with only one of the two dual-switch connecting one of the two dual-switch units coupled to the W-CDMA down converter and demodulation is used during a W-CDMA operation or said another of the two dual-switch units coupled to the UWB multiband down converter and demodulation is used during an UWB operation.~~

Claim 5 (cancelled)

Claim 6 (currently amended): The multiband MIMO-based dual-mode portable station of 3G W-CDMA and UWB communication receiver system of claim [[5]] 1 wherein said 3G W-CDMA down converter and demodulation is a QPSK demodulation UWB multiband has four UWB frequency bands within a frequency range from greater than 3.1 GHz to less than 5.15 GHz, each of the four UWB frequency bands having approximate 512 MHz with a magnitude below -41.3 dBm.

Claim 7 (currently amended): The multiband MIMO-based dual-mode portable station of 3G W-CDMA and UWB communication receiver system of claim [[2]] 1 wherein said UWB multiband down converter and demodulation includes an UWB sum over a block duration and four multiband down converters and demodulations P W-CDMA and UWB portable stations uses any one of said four UWB frequency bands or any combination of said four UWB frequency bands during the UWB operation.

Claim 8-9 (cancelled)

Claim 10 (currently amended): The multiband MIMO-based dual-mode portable station of 3G W-CDMA and UWB communication receiver system of claim [[9]] 1 wherein said eight A/D converters has the same sampling frequency rate and bit resolution, two of the eight A/D converters coupled to the two switch units that are controllable.

Claim 11 (currently amended) : The multiband MIMO-based dual-mode portable ~~station of 3G W-CDMA and UWB~~ communication ~~receiver system~~ of claim [[9]] 10 wherein said two switch[[es]] units connect[[s]] either two [[3G]] W-CDMA input signals or two UWB input signals.

Claim 12 (currently amended) : The multiband MIMO-based dual-mode portable ~~station of 3G W-CDMA and UWB~~ communication ~~receiver system~~ of claim [[9]] 10 wherein said only two of the eight A/D converters operate in parallel during the ~~3G a~~ W-CDMA receiver mode.

Claim 13 (currently amended) : The multiband MIMO-based dual-mode portable ~~station of 3G W-CDMA and UWB~~ communication ~~receiver system~~ of claim [[9]] 10 wherein said eight A/D converters operate in parallel and said two switch units that are coupled to two of the eight A/D converters connect to the two UWB input signals during [[the]] an UWB receiver mode.

Claim 14 (cancelled)

Claim 15 (currently amended) : The multiband MIMO-based dual-mode portable ~~station of 3G W-CDMA and UWB~~ communication ~~receiver system~~ of claim [[14]] 1 wherein said multiband rake receiver and decoder unit further includes twelve complex modulations, twelve digital filters, twelve despreaders and rake units, a MUX, a long code user-p mask, a long code generator, a XOR, a deinterleaver, a desymbol repetition, and a decoder.

Claim 16 (currently amended) : The multiband MIMO-based dual-mode portable ~~station of 3G W-CDMA and UWB~~ communication ~~receiver system~~ of claim 1 wherein said UWB OFDM multiband baseband processor unit further includes a combination section of a digital receiver filter unit, a multiband despreading unit, and a time-domain equalizer (TEQ) unit, four serial-to-parallel (S/P), four guard removing, four combinations of fast Fourier transform (FFT) and frequency-domain equalizer (FEQ), five parallel-to-serial (P/S), and a despreading, deinterleaver and decoding unit.

Claim 17 (currently amended) : The multiband MIMO-based dual-mode portable ~~station of 3G W-CDMA and UWB~~ communication ~~receiver system~~ of claim 16 wherein said combination section of [[a]] the digital receiver filter unit, [[a]] the multiband despreading unit, and [[a]] the TEQ unit further contains eight digital receiver filters, eight-XOR, four-multiband-despreading, four-MUX, and four-TEQ.

Claim 18 (currently amended) : The multiband MIMO-based dual-mode portable ~~station of 3G W-CDMA and UWB~~ communication ~~receiver system~~ of claim 16 wherein [[the]] each of the four combinations of the FFT and the FEQ further includes a ~~1024-point~~ FFT [[and]] having 1024 inputs, 512 outputs and 512 disable outputs, 500 of the 512 outputs are connected to 500 N-tap equalizers[[,]] followed by 500 decision detector units, and an adaptive algorithm, which is used to update the 500 N-tap equalizers.

Claim 19-20 (cancelled)

Claim 21 (currently amended) : A dual-mode Wideband Code Division Multiple Access (W-CDMA) and Ultra-Wideband (UWB) communication receiver comprising: ~~of 3G W-CDMA and UWB communication portable station comprises two antennas[{},]~~ ~~coupled to a MIMO-based dual-mode 3G W-CDMA and UWB filtering and multicarrier radio frequency (RF) section, a 3G W-CDMA baseband processor, an UWB OFDM multiband baseband processor, a 3G W-CDMA and UWB OFDM multiband control processor, and a sharing memory bank.~~

two antennas coupled to a Multiple-Input-Multiple-Output (MIMO)-based dual-mode W-CDMA and UWB filtering and multicarrier radio frequency (RF) section;
the MIMO-based dual-mode W-CDMA and UWB filtering and multicarrier RF section are connected to a W-CDMA baseband processor, an UWB OFDM multiband baseband processor, and a W-CDMA and UWB Orthogonal Frequency Division Multiplexing (OFDM) multiband control processor;

the W-CDMA and UWB OFDM multiband control processor coupled to the W-CDMA baseband processor, the UWB OFDM multiband baseband processor, and a sharing memory bank;

the sharing memory bank also coupled to the W-CDMA baseband processor, and the UWB OFDM multiband baseband processor;

the UWB OFDM multiband baseband processor using an UWB multiband;

the UWB multiband having four frequency bands within the frequency range from greater than 3.1 GHz to less than 5.15 GHz and a magnitude below -41.3 dBm;

the MIMO-based dual-mode W-CDMA and UWB filtering and multicarrier RF section further including two low noise amplifiers, two automatic gain controllers, two analog bandpass filters, two dual-switch units, a W-CDMA down converter and demodulation, an UWB multiband down converter and demodulation, and an analog-to-digital (A/D) converter unit; and

the A/D converter unit having the same type of eight A/D converters that can operate at a sampling rate of 540 MHz.

Claim 22 (currently amended): The dual-mode W-CDMA and UWB communication receiver ~~of 3G W-CDMA and UWB~~ communication portable station of claim 21 wherein said UWB OFDM multiband baseband processor deals with four UWB-OFDM multi-frequency bands, with each [[of]] frequency band having 512 MHz approximately.

Claim 23 (currently amended): The dual-mode W-CDMA and UWB communication receiver ~~of 3G W-CDMA and UWB~~ communication portable station of claim 21 wherein said ~~3G W-CDMA and UWB OFDM multiband control processor controls data flow exchanging in the receiver~~ only two among the eight A/D converters are operated producing an oversampling rate of 36 times for W-CDMA input signals.

Claim 24-25 (cancelled)

Claim 26 (new): The dual-mode W-CDMA and UWB communication receiver of claim 21 wherein eight A/D converters are operated in parallel for UWB input signals, each A/D converter having a 540-MHz sampling rate.